MIL-STD-2045-14500-3
16 March 1994

MILITARY STANDARD

Information Technology
DOD Standardized Transport Profile

TA21n(D) COTS OVER CLNS

Part 3: Subnetwork for an Unbalanced Link

AMSC: N/A   AREA: DCPS

Foreword

This military standard is approved for use by all Departments and Agencies of the Department of Defense (DOD).

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be of use in improving this MIL-STD should be addressed to the:

> Joint Interoperability and Engineering Organization (JIEO)
> ATTN: TBBF
> Fort Monmouth, New Jersey 07703-5613

by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this MIL-STD or by memorandum.

This DOD Standardized Profile (DSP) is a functional DOD Data Communications Protocol Standard (DCPS) produced by the DCPS Technical Management Panel (DTMP) Working Group 1 on Lower Layers. The MIL-STD-2045 document series was established within the DCPS Standardization Area to allow for the enhancement of commercial standards or the development of standards that are unique to DOD. DTMP functional standards are functional groupings of base standards. Referenced base standards may be commercial, DOD or de facto standards, although International Standards (produced by the International Standards Organization (ISO), the Inter-Telecommunication Union (ITU) (formerly known as the Consultative Committee for International Telephone & Telegraph (CCITT)), and other bodies) are preferred when possible.

The MIL-STD-2045-10000 series, MIL-STD-2045-10000 to MIL-STD-2045-19999 inclusive, will be used to describe how DOD will implement commercial, international, national, federal, or military standards within the functional profile concept to provide required network services. The Government Open Systems Interconnection Profiles (GOSIP) will serve as the base for developing the 10000 series with DOD enhancements, unique military standards, and interim standards being used only when necessary.

The MIL-STD-2045-20000 series, MIL-STD-2045-20000 to MIL-STD-2045-29999 inclusive, will be used to describe DOD enhancements and extensions to existing commercial, international, national, or federal standards.

The MIL-STD-2045-30000 series, MIL-STD-2045-30000 to MIL-STD-2045-39999 inclusive, will be used to describe protocols and services unique to DOD that will not be supported by commercial, international, national, or federal standards.

The MIL-STD-2045-40000 series, MIL-STD-2045-40000 to MIL-STD-2045-49999 inclusive, will be used to document interim standards. Interim standards document protocols and services needed by DOD until these protocols and services are described in either a GOSIP or a MIL-STD-2045-20000 or -30000 series standard.

Specific details and instructions for establishing a MIL-STD-2045 document, as well as profile development guidelines, are documented in MIL-HDBK-829. DTMP Working Groups shall be responsible for DSP development and informal Service or Agency coordination; the DTMP Plenary shall be responsible for final review and approval.

This document was produced as an outgrowth of a requirement established for transmitting digital imagery and imagery-related products using the National Imagery Transmission Format Standard (NITFS) and is intended to be a generic connectionless transport profile for end systems (ES) to communicate over DOD or commercial circuits.

This document is part of a set of DOD data communications protocol profiles and is intended to support the interoperability of DOD communication networks, ultimately including connectivity with the Defense Data Network (DDN).

The current technical content of this document has been derived wherever possible from ISO 4335, ISO 4335 AM 4, ISO 3309, and ISO 7809. However, this document is based on DOD requirements; and differences between the content of this document and these base standards may exist. This document must be combined with ISO 4335, ISO 4335 AM 4, ISO 3309, and ISO 7809.

This part of MIL-STD-2045-14500 contains one normative annex and one informative annex:

Annex A (normative)   DSPICS REQUIREMENTS LIST (DPRL)
Annex B (informative)   CONCLUDING MATERIAL

For DOD acquisition purposes, where such differences exist, this DSP shall be the controlling document.

The Preparing Activity for this standard is the DTMP. The custodians for the document are identified in the Defense Standardization Program, "Standardization Directory (SD-1)," and are classified in the Federal Supply Classification (FSC) system under Data Communications Protocol Standards (DCPS). Additional information can be obtained from:

Joint Interoperability and Engineering Organization (JIEO)
ATTN: DTMP Chairman
Fort Monmouth, New Jersey 07703-5613

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Introduction

This DOD Standardized Profile (DSP) is defined within the context of functional standardization, in accordance with the principles specified by ISO/IEC TR 10000, "Framework and Taxonomy of International Standardized Profiles," and MIL-HDBK-829. The context of functional standardization is one part of the overall field of information Technology (IT) standardization activities - covering base standards, profiles, and registration mechanisms. A profile defines a combination of base standards that perform a specific well-defined IT function. Profiles standardize the use of options and other variations in the base standards to promote system interoperability and to provide a basis for the development of uniform, internationally recognized system tests.

One of the most important roles for a DSP is to serve as the basis for the development of recognized tests. DSPs also guide implementors in developing systems that fit the needs of the US Department of Defense (DOD). DSPs are produced not simply to `legitimize' a particular choice of base standards and options, but to promote real system interoperability. The development and widespread acceptance of tests based on this and other DSPs are crucial to the successful realization of this goal.

The base standards of this DSP are the Open Systems Interconnection (OSI) Reference Model for OSI Layer standards. The Layer standards are composed of the ISO, ITU, other international civil standards, or Federal Information Processing Standards (FIPS).

This document is intended to be part of a complete transport profile that specifies a connection-mode transport service over a connectionless mode network service operating over a subnetwork dependent service that provides a synchronous, asynchronous, half-duplex and full-duplex dedicated digital circuit. This transport profile is a multipart profile, of which this is Part 3. Part 3 identifies the subnetwork dependent part that specifies the requirements for a connection-mode operation which provides the Unbalanced Link requirements where the unbalanced configuration is selected.

This DSP is intended to be GOSIP-compliant. Since GOSIP permits differing subnetwork technologies, the excursions from those subnetworks described in FIPS 146-1, or use of standards that are clearly an update in the series, are of no real consequence to GOSIP internetworking capabilities and only affect the particular subnetwork being employed. The internetworking and end-system to end-system (ES-ES) aspects are fully compliant.

Selections of options are a decision and choice left solely to the implementor based on operational necessity. Vendors shall implement the options chosen by the implementor.

This part of MIL-STD-2045-14500 contains one normative annex and one informative annex:

> Annex A DSPICS Requirements List (DPRL) (Normative)
> Annex B Concluding Material (Informative)

Information Technology - DOD Standardized Profile (DSP) TA21n(D) - Part 3: Subnetwork for an Unbalanced Data Link

1   Scope

This part of MIL-STD-2045-14500 lists the requirements for an implementation of MIL-STD-2045-14500 using an unbalanced mode of operation for the data link layer derived from the High-Level Data Link Control (HDLC) standards instead of the balanced mode described in LAP-B.

1.1   General

An unbalanced configuration provides for one primary station and one or more secondary stations to operate as point- to-point or multipoint, half duplex or full duplex, switched or nonswitched, and synchronous or stop/start transmission. The configuration is unbalanced because the primary station is responsible for controlling the interchange of data with each secondary station and for establishing and maintaining the link.

There are two unbalanced modes of operation: Normal Response Mode (NRM) and Asynchronous Response Mode (ARM). The term asynchronous has nothing to do with the data format and the physical interface of the stations. It indicates that the stations need not receive a preliminary signal from the primary station before sending traffic. Consequently, this part of MIL-STD-2045-14500 specifies the use of ARM. Error control shall be handled using the HDLC rejection (REJ) frame to implement the go-back-in technique. Optionally, selective rejection (SREJ frame) and multi-selective rejection may be implemented for increased performance.

1.2   Scenario

This part of MIL-STD-2045-14500 specifies the data link layer for unbalanced operation and shall be used in place of the data link layer specified in MIL-STD-2045-14500-2 when unbalanced operations are required.
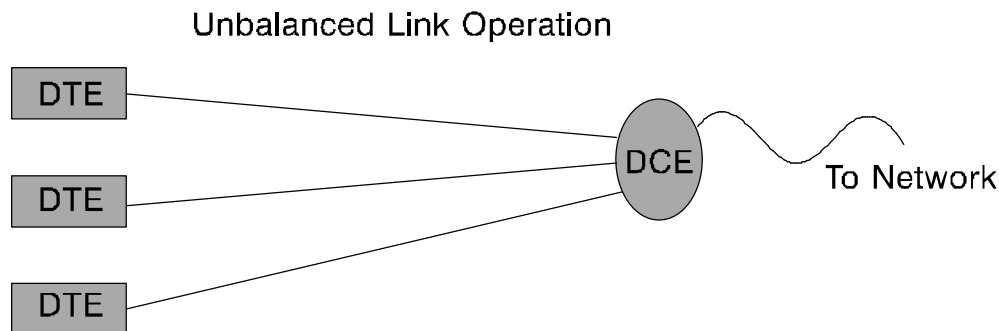

Unbalanced Link Operation

2

Figure 1. Unbalanced Link Operation

2 References

The following documents contain specific provisions which, through reference and selection in this text, constitute the required operational conditions for this DSP. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this DSP are warned against automatically applying any more recent editions of the documents listed below, since the references made by DSPs to such documents may be specific to a particular edition. The standards referenced by a base standard apply to the DSP only to the extent that they apply to that base standard and to the extent that the DSP allows.

2.1 Government Documents

2.1.1 Specifications, Standards, and Handbooks

The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

Federal Information Processing Standards (FIPS):

FIPS 146-1:1991: *Government Open Systems Interconnection Profile (GOSIP), Version 2.*

Military Handbooks (MIL-HDBKs):

MIL-HDBK-829: *Guidelines for Developing Data Communications Protocol Standards (MIL-STD-2045 Series Documentation*).

DOD activities may obtain copies of DOD directives through their own publications channels or from the DOD Single Stock Point, Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094. Other federal agencies and the public may purchase copies from the U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161-2171. Copies of FIPS are available to DOD activities from the Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120-5099. Others must request copies of FIPS from the U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161-2171.

2.1.2 Other Government Documents, Drawings, and Publications

The following other government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

NIST SP-500-206: *Stable Implementation Agreements for Open Systems Interconnection Protocols Version 6 Edition 1.*

2.2 Non-Government Documents

The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD-adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation.

2.2.1 Profiles

ISP 10608-1: *Information Technology - International Standardized Profile TAnnnn - Connection-mode Transport Service over Connectionless-mode Network Service. 1992-04-30 Part 1: General Overview and Subnetwork-type Independent Requirements.*

(Application for copies of these documents should be addressed to the American Standards Institute, 11 West 42nd Street, New York, NY 10036 or to ISO, Van Demonstrate 94, 1013 CN Amsterdam, Netherlands.)

2.2.2 Base Standards

DIS 4335.2:1990: *Information Technology - Telecommunications and Information Exchange between Systems - High-Level Data Link Control (HDLC) Procedures - Elements of Procedures.*

ISO 7776:1993: *Information Technology - Data Communication - High Level Data Link Control Procedures - Description of the X.25 LAPB-compatible DTE Data Link Procedure.*

EIA 232-D:1987: *EIA 232-D, Interface Between Data Terminal Equipment and Data Circuit-Termination Equipment Employing Serial Binary Data Interchange.*

EIA 530:1992: *EIA 530, Interface Between Data Terminal Equipment and Data Circuit-Termination Equipment Employing Serial Binary Data Interchange.*

2.2.3 Other Non-Government Documents, Drawings, and Publications

The following other non-government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

ISO 3309:1991: *Information Technology - Telecommunications and Information Exchange Between Systems - High Level Data Link Control (HDLC) Procedure - Frame Structure.*

ISO 4335:1991/DAM 4: *Information Technology - Telecommunications and Information Exchange between Systems - High-Level Data Link Control (HDLC) Procedures - Elements of Procedures - Amendment 4: Multi-Selective Reject Option.*

ISO 7776:1986/PAM 2:1992: *Information Processing Systems - Data Communication - High-Level Data Link Control Procedures - Description of the X.25 LAPB-compatible DTE Data Link Procedures - Amendment 2: Procedures For Multi-Selective Reject Option.*

CCITT V.10: *Electrical characteristics for unbalanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications.*

CCITT V.11: *Electrical characteristics for balanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications.*

CCITT X.21:1988: *Interface Between Data Terminal Equipment (DTE) and Data Circuit-Termination Equipment (DCE) for Synchronous Operation on Public Data Network.*

ISO 7498:1984: *Information Processing Systems - Open Systems Interconnection - Basic Reference Model.*

ISO TR 10000: *Information Technology - Framework and Taxonomy of International Standardized Profiles.*

ISO 9542:1988: *Information Processing Systems - Telecommunications and Information exchange between systems -End system to Intermediate System routing exchange protocol for use in conjunction with the Protocol for providing the Connectionless Mode network service.*

(Application for copies of these documents should be addressed to the American Standards Institute, 11 West 42nd Street, New York, NY 10036 or to ISO, Van Demonstrate 94, 1013 CN Amsterdam, Netherlands.)

3   Definitions

For the purposes of this part of DSP 2045-14500, the following terms have the meanings stated in DSP Guidelines:

Base Standard
DOD Protocol Implementation Conformance Statement (DPICS)
DOD Standardized Profile (DSP)
DOD Standardized Profile Implementation Conformance Statement (DSPICS)
DSPICS Requirements List (DPRL)

4   Abbreviations and Acronyms

The symbols and abbreviations used in this DSP are defined in MIL-HDBK-829, in the referenced base standards, or in the standards referenced by the base standards.

ABM	Asynchronous Balanced Mode
ADM	Asynchronous Disconnect Mode
ASE	Application Service Element
CCITT	The International Telegraph and Telephone Consultative Committee
CL	Connectionless
CLNS	Connectionless Network Service
CLTS	Connectionless Transport Service
CO	Connection-oriented (or Connection Mode)
CONS	Connection-oriented Network Service
COTS	Connection-oriented Transport Service
DCE	Data Circuit-Terminating Equipment
DCPS	Data Communications Protocol Standards
DDN	Defense Data Network
DIS	Draft International Standard
DISA	Defense Information Systems Agency
DISC	Disconnect
DL	Data Link
DM	Disconnect Mode
DOD	Department of Defense
DODISS	DOD Index of Specifications and Standards
DSP	DOD Standardized Profile
DTE	Data Terminal Equipment
DTMP	DCPS Technical Management Panel
EIA	Electronics Industries Association
ER	Error Report
ES	End System
ES-ES	End System-to-End System
FCS	Frame Check Sequence
FEC	Forward Error Correction
FIPS	Federal Information Processing Standard
FRMR	Frame Reject
FSC	Federal Supply Classification
GNMP	Government Network Management Profile
GOSIP	Government Open Systems Interconnection Profile
IEC	International Electrotechnical Commission
IGOSS	Industry/Government Open Systems Specification
IPRL	ISPICS Requirements List
IS	International Standard
ISO	International Organization for Standardization; International Standards Organization
ISO-TR	ISO Technical Report
ISP	International Standardized Profile
ISPICS	ISP Information Conformance Statement
IT	Information Technology
ITU	Inter-Telecommunication Union
JIEO	Joint Interoperability and Engineering Organization

Kbps	Kilo bits per second
Mbps	Mega bits per second
MIL-HDBK	Military Handbook
MIL-STD	Military Standard
NCMS	Network Connection Management Subprotocol
NDM	Normal Disconnect Mode
NIMP	NATO Interoperability Management Plan
NIST	National Institute of Standards and Technology
NIST-SP	NIST Special Publication
NITF	National Imagery Transmission Format
NITFS	NITF Standard
NLSP	Network Layer Security Protocol
NPDU	Network Protocol Data Unit
NS	Network Service
NSAP	Network Service Access Point
NSDU	Network Service Data Unit
OSE	Open Systems Environment
OSI	Open Systems Interconnection
PDAM	Proposed Draft Amendment (ISO)
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
QOS	Quality of Service
RD	Request Disconnect
REJ	Reject
RIM	Request Initialization Mode
RNR	Receive Not Ready
ROA	Request of Acknowledgement Mark
RR	Receiver Ready
RSET	Reset
SABM	Set Asynchronous Balanced Mode
SABME	Set Asynchronous Balanced Mode Extended
SATCOM	Satellite Communication
SD-1	Standardization Directory 1
SIA	Stable Implementors' Agreement
SIM	Set Initialization Mode
SN	SubNetwork
SNDCF	Subnetwork Dependent Convergence Function
SREJ	Selective Reject
STANAG	NATO Standardization Agreement
TAnnnn	Subnetwork Independent COTS over CLNS Profile
TC	Transport Connection
TCS	Trusted Communication Sublayer
TIS	Technical Interface Specification
TLSP	Transport Layer Security Protocol
TP4	Transport Protocol Class 4
TPDU	Transport Protocol Data Unit
TS	Transport Service
TSAP	Transport Service Access Point
UA	Unnumbered Acknowledgement Frame
UAnnnn	Subnetwork Independent CLTS over CLNS Profile
UI	Unnumbered Information Frame
UP	Unnumbered Poll Frame
XID	Exchange Identification Frame

5   Data Link Requirements

A conforming implementation of this part of MIL-STD-2045-14500, for unbalanced mode operation, shall satisfy the specified requirements of ISO 4335 and ISO 3309. The multi-selective reject option shall satisfy the requirements of ISO 4335 AM 4.

5.1   Static Conformance Requirements

This section contains a defined set of services and performing functions of the High Level Data Link Control (HDLC) protocol. This set of services and functions identifies the Unbalanced operation Asynchronous Response Mode (ARM) Class (UAC) with options 2 and 10 selected. Option 2 includes the addition of the reject command for improved performance as specified in ISO 4335. Option 10 specifies extended sequence numbering. The link established can be half duplex (Two Way Alternate) or full duplex (Two Way Simultaneous). The data link channel may be either synchronous or start/stop as specified in the HDLC standards. Information for this section is obtained directly from the base standards ISO 4335, ISO 4335 AM 4, ISO 3309, and ISO 7809. The information contained in this section can be found in the base standards; therefore, it is intended to be a summary of normative requirements.

5.1.1   Services Provided by the Data Link Layer

The HDLC protocol shall provide a reliable connection-oriented transfer of data. It shall activate, maintain, and deactivate the link and detect and control errors.

5.1.2   Modes of Operation

The HDLC protocol shall provide for an unbalanced data link operating in half or full duplex modes. In an unbalanced data link, a primary station assumes responsibility for organizing the data flow and for unrecoverable data link level error conditions associated with all transmissions occurring on the link. The operational mode, Asynchronous Response Mode (ARM), associated with unbalanced configurations, shall be used. The non-operational mode, Asynchronous Disconnected Mode (ADM), shall be used when the link is not active.

5.1.3   Data Link Functions

5.1.3.1   Link Establishment

The link between a primary station and one or more secondary stations in ARM on an unbalanced link shall be established when the primary station transmits a Set Asynchronous Response Mode (SARM) command or a Set Asynchronous Response Mode Extended (SARME) command and the addressed secondary station responds with an Unnumbered Acknowledgement (UA) response.

5.1.3.2   Link Disconnection

The link between a primary station and a secondary station in ARM shall be disconnected when the primary station transmits a Disconnect (DISC) command and the addressed station responds with a UA response.

5.1.3.3   Connection-Oriented Data Transfer

5.1.3.3.1   The Information Transfer Format command and response (I command/response) shall be used to transfer sequentially numbered frames, each containing an information field, across the data link.

5.1.3.3.2   Every I command/response shall contain a send sequence number and a receive sequence number. The sequence numbers shall be modulo-8 for a link established using an SARM command, or modulo-128 for a link established with an SARME command.

5.1.3.3.3   The flag sequence shall consist of the binary sequence 01111110. A flag that terminates one frame shall also signal the beginning of the next frame.

5.1.3.3.4   The information field shall contain data for the next higher layer protocol and is found before the Frame Check Sequence (FCS). The information field must be an integer number of octets.

5.1.3.3.5   An FCS shall normally consist of 16 bits and is found before the closing flag. A 32-bit FCS is optional.

5.1.3.3.6   The address field shall consist of one octet and shall be used to identify the secondary station. A command frame shall be a frame originating from the primary station destined to a secondary station. A response frame is a frame originating from a secondary station destined to the primary station. The "all-station" address is a form of broadcast and shall not be acknowledged by the secondary stations. Group polling shall not be invoked.

5.1.3.3.7   Error control shall be accomplished by rejection when a sequence error is detected. Upon receipt of a reject frame (REJ), the station shall go back and retransmit from the frame with a sequence number identified by the reject frame. Optionally, for improved performance, selective reject may be selected. Upon receipt of a selective reject frame (SREJ), a station only has to retransmit that frame identified by the selective reject frame. Multi-selective reject may be accomplished by using the information field to selectively reject additional frames.

5.1.3.3.8   The Receiver Ready (RR) command and response shall be used by the data station to indicate that it is ready to receive an I frame(s) and to acknowledge previously received I frames numbered up to the receive sequence number contained in the RR command/response minus one.

5.1.3.3.9   The Receiver Not Ready (RNR) command and response shall be used by the data station to indicate a "busy" condition, i.e., temporary inability to accept subsequent I frames.

5.1.3.3.10   The Frame Reject (FRMR) response shall be used to report that a condition not correctable by retransmission has occurred.

5.2   Dynamic Conformance Requirements

5.2.1   All invalid frames shall be discarded. An invalid frame is one that has invalid length, contains an unrecognized address or control field, has an invalid FCS, or was aborted.

5.2.2   A frame abort procedure, if implemented, shall be signalled by transmitting at least seven continuous one bits.

5.2.3   Inter-frame time fill shall be accomplished by transmitting continuous flag sequences during Synchronous transmission. Mark-Hold is an option under Start-Stop transmission.

5.2.4   A secondary station in ADM shall be capable of initiating a response with a Disconnect Mode (DM) frame.

6   Physical Layer Recommendations

A conforming implementation to this part of MIL-STD-2045-14500 shall satisfy the performance requirements of EIA 232-D or EIA 530. The Physical Layer interface is not mandated, only recommended as is done in GOSIP. However, if the Physical Layer Interface selected is EIA 232-D or EIA 530, the performance requirements specified in this profile shall pertain.

Prior to January 1987, the EIA 232-D was named RS-232-C. The D version brings the specification in line with CCITT V.24, V.28 and ISO 2110. This version includes the addition of local loopback, remote loopback, and test mode interchange circuits. Protective ground has been redefined and a shield has been added. EIA 232-D is used for the data transmission range of 0-20 Kbps over distances up to 50 feet.

EIA 530 accommodates data transmission rates from 20 Kbps to 2 Mbps and for very short distances up to 10 Mbps. EIA 530 is compatible with CCITT V.10, V.11, X.26 and MIL-STD-188-114.

6.1   Static Conformance Requirements

Changes in the static conformance requirements for EIA 232-D and EIA 530 will be reflected in footnotes pertinent to the function as appearing in the PICS.

6.2   Dynamic Conformance Requirements

Changes in the dynamic conformance requirements for EIA 232-D and EIA 530 will be reflected in footnotes pertinent to the function as appearing in the PICS.

ANNEX A

(normative)

DSPICS REQUIREMENTS LIST (DPRL)

A.1   Introduction

This document provides the DOD Standardized Profile Implementation Conformance Statements (DSPICS) Requirements List (DPRL) for implementations of MIL-STD-2045-14500-3. The DSPICS for an implementation is generated by completing the DPRL in accordance with the instructions given below.

The DPRL is based on the base standard and its PICS proforma where existing. The proforma in this document are based on those proforma accompanying the referenced base standards, or on the text clauses in the bases standards.

An implementation shall satisfy the mandatory conformance requirements of the base standards referenced in this profile.

An implementation's completed DPRL is called the DSPICS. The DSPICS states which capabilities and options of the protocol have been implemented. The following can use the DSPICS:

   (a) the protocol implementor, as a checklist to reduce the risk of failure to conform to the standard through oversight.

   (b) the supplier and acquirer or potential acquirer of the implementation, as a de tailed indication of the capabilities of the implementation, stated relative to the common basis for understanding provided by the standard DSPICS proforma.

   (c) the user or potential user of the implementation, as a basis for initially checking the possibility of inter-working with another implementation (note that, while inter-working can never be guaranteed, failure to internetwork can often be predicted from incompatible DSPICSs).

   (d) a protocol tester, as the basis for selecting appropriate tests against which to assess the claim for conformance of the implementation.

A.1.1 Notation

The following notations and symbols from MIL-HDBK-829, which references ISO/IEC TR 10000-1 and -2, are used in the DPRL to indicate the status of features:

Status Symbols

m	-	mandatory
m.<n>	-	support of every item of the group labeled by the same numeral <n> required, but only one is active at a time
o	-	optional
o.<n>	-	optional, but support of at least one of the group of options labeled by the same numeral <n> is required
c	-	conditional
-	-	non-applicable (i.e., logically impossible in the scope of the profile)
x	-	excluded or prohibited
i	-	out of scope of profile (left as an implementation choice)

In addition, the symbol "•" is used to indicate an option whose status is not constrained by the profile (status in the base standard). The o.<n> notation is used to show a set of selectable options (i.e., one or more of the set must be implemented) with the same identifier <n>.

Two character combinations may be used for dynamic conformance requirements. In this case, the first character refers to the static (implementation) status, and the second refers to the dynamic (use); thus "mo" means "mandatory to be implemented, optional to be used."

Notations for Conditional Status

The following predicate notations are used:

<predicate>:: This notation introduces a group of items, all of which are conditional on <predicate>.

<predicate>: This notation introduces a single item which is conditional on <predicate>.

In each case, the predicate may identify a profile feature or a Boolean combination of predicates. ("^" is the symbol for logical negation.)

<index>: This predicate symbol means that the status following it applies only when the DPICS states that the features identified by the index are supported. In the simplest case, <index> is the identifying tag of a single DPICS item. The symbol <index> also may be a Boolean expression composed of several indexes.

<index>::   When this group predicate is true, the associated clause should be completed.

Notations used in the Protocol Feature Column

<r>   Symbol used to denote the receiving system.
<t>   Symbol used to denote the transmitting system.

Support Column Symbols

The support of every item as claimed by the implementor is stated by circling the appropriate answer (Yes, No, or N/A) in the support column:

Yes   Supported by the implementation.
No   Not supported by the imple mentation.
N/A   Not applicable.

Base standard requirements are shown using the equivalent notations in upper case (e.g., M, O, X).

A.1.2 Footnotes

Footnotes to the proforma are indicated by superscript numerals. The footnote appears on the page of the first occurrence of the numeral. Subsequent occurrences of a numeral refer to the footnote of the first occurrence.

A.1.3 Instructions for Completing the DPRL

A DSP implementor shows the extent of compliance to a DSP by completing the DPRL; that is, compliance to all mandatory requirements and the options that are not supported are shown. The resulting completed DPRL is called a DSPICS. Where this profile refines the features of the base standards, the requirements expressed in this DPRL shall be applied (as indicated in DPRL items with no "Profile Support" column) to constrain the allowable responses in the base standard PICS proforma. When this profile makes additional requirements, the "Profile Support" column for such DPRLs shall be completed. In this column, each response shall be selected either from the indicated set of responses or it shall comprise one or more parameter values as requested. If a conditional requirement is inapplicable, use the Not Applicable (NA) choice. If a mandatory requirement is not satisfied,

exception information must be supplied by entering a reference Xi, where i is a unique identifier, to an accompanying rationale for the noncompliance. When the profile requirement is expressed as a two-character combination (as defined in A.1.1 above), the response shall address each element of the requirement; e.g., for the requirement "mo," the possible compliant responses are "yy" or "yn."

A.2   Standards Referenced

This profile specifies the provision for an unbalanced data link protocol. It uses the following standards:

ISO 3309	High-level data link control procedures - Frame structure
ISO 4335	High-level data link control procedures - Elements of procedures
ISO 4335 AM4	High-level data link control procedures - Multi-selective rejection
ISO 7809	High-level data link control procedures - Consolidation of classes of procedures

A.3   DSPICS Requirements List

A.3.1 General Information

A.3.1.1   Implementation Identification

Supplier	
Contact point for queries about the profile	
Implementation name(s) and version(s)	
Date of statement	
Other information: machine name, operating system, system name	

A.4 Data Link Layer

The Data Link Layer selections must be used within the base standards for High Level Data Link Control (HDLC), ISO 4335, and ISO 3309.

A.4.1 General Information

Item	Feature	Base Standard		Profile		Support
		Reference	Status	Clause	Status	
SL	Single Link	0	M		m	Yes
Link Configuration						
CBL	Balanced Link	0.3	O		i	No
CUL	Unbalanced Link	0.2	O		m	Yes
Does Station Support						
NRM	Normal Response Mode	5.1.1	O		i	No
ARM	Asynchronous Response Mode	5.1.2	O		m	Yes
ABM	Asynchronous Balanced Mode	5.1.3	O		i	No

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Item	Feature	Base Standard		Profile		Support
		Reference	Status	Clause	Status	
SY	Synchronous Operation	4.5.1[1]	O.1		o.1	Yes No
SS	Start/Stop Operation	4.5.2[1]	O.1		o.1	Yes No
TWA	Two Way Alternate	3.23	O		o	Yes No
TWS	Two Way Simultaneous	3.18	O		o	Yes No

A.4.2 General Frame Information

Item	Feature	Base Standard		Profile		Support
		Reference	Status	Clause	Status	
F1a	Basic (Modulo 8)	6.2.1	O.2		m	Yes
F1b	Extended (Modulo 128)		O.2		m	Yes
F2	Station Capable of Sending Non-Octet Aligned Frames	4.4[1]	O		x	No
Receipt of Non-Octet Aligned Frames Cause		3.4[1]				
F3a	Discard of Frame as Invalid		O.3		m	Yes
F3b	Acceptance of Frame as Valid		O.3		x	No
F4	Specified Frame Structure Supported	6.0 2.0[1]	M		m	Yes
All Frames Contain the Following Fields:		6.0				
F5a	Opening Flag	3.0[1]	M		m	Yes
F5b	Address		M		m	Yes
F5c	Control		M		m	Yes
F5d	Frame Check Sequence (FCS)		M		m	Yes
F5e	Closing Flag		M		m	Yes
	FCS Length	3.6[1]				
F6a	16 Bits		M		m	Yes
F6b	32 Bits		O		o	Yes No
Address Field Length		5.1[1]				
F7a	Single Octet		M		m	Yes
F7b	Multiple Octet		O		x	No
Control Field Length		5.2[1]				
F8a	Normal	7.4	M		m	Yes
F8b	Extended		O		m	Yes

Note 1: ISO 3309

Item	Feature	Base Standard		Profile		Support
		Reference	Status	Clause	Status	
F9	Station Capable of Accepting a Single Flag as the Closing Flag for One Frame and the Opening Flag for the Next Frame	3.1[1] 3.9[1]	M		m	Yes
F10	Does Station Generate a Single Flag as Above?	3.1[1] 3.9[1]	O		m	Yes
F11	Frame Abortion Supported for Reception of Frames	4.1.2 3.9[1]	M		m	Yes
F12	Frame Abortion Supported for Transmission of Frames	4.1.2 3.9[1]	O		o	Yes No
F13	All Aborted Frames Treated as Invalid	3.9[1]	M		m	Yes
Invalid Frame Result From		3.9[1]				
F14a	Frame not Bound by two Flags	3.9[1]	M		m	Yes
F14b	Frame Not Long Enough		M		m	Yes
F14c	Invalid FCS		M		m	Yes
F14d	Unrecognized address		M		m	Yes
F14e	Unrecognized control field		M		m	Yes
F15	All Invalid Frames Discarded and No Action Taken as a Result	3.9[1]	M		m	Yes
Interframe Time Fill		4.1.3				
F16a	Synchronous: By Transmitting Continuous Flags		SY:M		SY:m	Yes
F16b	Start/Stop: By Transmitting Continuous Flags		SS:O.4		SS:o.4	Yes No
F16c	By Mark Hold (Logical 1)		SS:O.4		SS:o.4	Yes No
F17	Intraframe Time Fill Accomplished By Mark Hold (Logical 1)	4.1.4	SS:M		SS:m	Yes
Idle Data Link Results When						
F18a	15 Continuous '1's Have Been Detected	4.2.1	SY:M		SY:m	Yes
F18b	Mark Hold Condition Persists for a System Defined Period	4.2.2	SS:M		SS:m	Yes
F19	All-Station Address Supported (All 1 Address Field)	6.2[1]	M	5.1.3.3.6	m	Yes
F20	No-Station Addressing Supported (All 0 Address Field)	6.3[1]	M	5.1.3.3.6	m	Yes
F21	Group Addressing Supported	6.4[1]	M		m	Yes
F22	All-Station Poll Supported	6.2[1]	M	5.1.3.3.6	x	No
F23	Group Poll Supported	6.4[1]	M	5.1.3.3.6	x	No

Note 1:   ISO 3309

A.4.3 Data Transfer

Item	Feature	Base Standard		Profile		Support
		Reference	Status	Clause	Status	
I1	Station Support Transmission of I Frames	6.1.2	M		m	Yes
I2	Station Support Reception of I Frames	7.1	M		m	Yes
S1	Station Support Transmission of S Frames	6.1.3	M		m	Yes
S2	Station Support Reception of S Frames	7.2	M		m	Yes
U1	Station Support Transmission of U Frames	6.1.4	M		m	Yes
U2	Station Support Reception of U Frames	7.3	M		m	Yes
SSN	Station Support Use of Send Sequence Numbers	6.2.2	M		m	Yes
RSN	Station Support Use of Receive Sequence Numbers	6.2.2	M		m	Yes

A.4.4 Procedures

Item	Feature	Base standard		Profile		Support
		Reference	Status	Clause	Status	
Secondary Station in Disconnect Mode		5.2				
P1a	Accepts & Responds to Mode Setting Commands		O		m	Yes
P1b	Accepts & Responds to XID Commands	5.2.2	O		x	No
P1c	Accepts & Responds to Test Commands		O		x	No
P1d	Accepts & Responds to UP Commands		O		x	No
P1e	Transmits DM, RD at Respond Opportunities to Solicit Action on Part of Primary Station		O		m	Yes
P1f	Accepts UI Frame		O		x	No
P1g	Transmits UI Response		O		x	No
P3	Secondary Station in Disconnect Mode Generates DM Response To Commands with P=1	5.2	M		m	Yes
P8	Asynchronous Disconnect Mode (ADM) Supported	5.2.2	O		m	Yes
Secondary Station in ADM Initiates Response Transmissions with		5.2.2				
P9a	UI Frames		O		x	No
P9b	XID Frames		O		x	No
P9c	DM Frames		O		m	Yes
P9d	RIM Frames	5.2.2	O		x	No
P11	Secondary Station Responds with RIM if Unable to Function		O		x	No

Item	Feature	Base standard		Profile		Support
		Reference	Status	Clause	Status	
P12	Secondary Station in ADM Ignores Commands with P=0 Other Than UP, and Implemented Mode Setting Commands		O		m	Yes
Secondary Station in ADM upon Receipt of UI with P=1 Responds with						
P13a	UI Response		O		x	No
P13b	DM Response		O		m	Yes
P13c	RIM Response		O		x	No
P21	Station's Maximum Outstanding I Frames never Exceed the Modulo minus 1	6.2.1	M		m	Yes
P22	Number of Outstanding Frames is Further Restricted	6.2.1	O		o	Yes No
P24	P/F Bit Supported in ARM	6.3.1.1 6.3.1.3 6.3.2.2	ARM:M else O		m	Yes
P26	Primary Station retransmission of Commands with P Bit Supported if no Valid Response is Received Within a System Defined Timeout	6.3.1.1	M		m	Yes
P28	Station in ARM Transmits with F=0 at any Response Opportunity on Asynchronous Basis	6.3.2.2	O		m	Yes
P29	Station Continues to Transmit Frames After Sending a Response with F=1		O		m	Yes
P30	Primary Station Uses S Frames with P=1 to Poll Secondary Stations	7.2	O		o	Yes No
P31	RR Command Supported	7.2.1	M		m	Yes
P32	Following Receipt of Mode Setting Command, Station Ignores Frames Except to Detect Respond Opportunity	7.3.1	O		m	Yes
P34	XID Command/Response Supported	7.3.2.7	O		x	No
P35	XID Command Contains the Information Field	7.3.1.11	O		x	No
P36	TEST Command/Response Supported	7.3.2.8	O		x	No
P37	TEST Command Uses the Information Field	7.3.1.13	O		x	No
P38	RESET Command Supported	7.3.1.12	O		-	No
P39	RESET Sent (To Clear Frame Reject Condition) by Combined Station that Detects an Invalid N(R)		O		-	No
P40	UP command Supported	7.3.1.9	O		o	Yes No
P41	UI Command/Response Supported except in ADM mode	7.3.1.10 7.3.2.6	O		o	Yes No
P42	DM Response Supported	7.3.2.3	M		m	Yes
P43	RD Response Supported	7.3.2.4	O		o	Yes No
P44	RIM Response Supported	7.3.2.5	O		x	No
After Sending FRMR, Secondary/Combined Station		7.3.2.2				
For FRMR for Invalid N(R)						

Item	Feature	Base standard		Profile		Support
		Reference	Status	Clause	Status	
P45a	Stops Transmission of I Frames		M		m	Yes
For Undefined Command or Response						
P45b	Stops Transmission of I Frames		O.11		x	No
P45c	Continues Transmission of I Frames		O.11		m	Yes
For I Frame Length Invalid						
P45d	Stops Transmission of I Frames		O.12		x	No
P45e	Continues Transmission of I Frames		O.12		m	Yes
P46	FRMR Information Field Padded to End on Octet or Specified Character Length Boundary	7.3.2.2	O		m	Yes
P47	FRMR Control Field Extension Supported	7.3.2.2	O		m	Yes

A.4.5 Exception Condition Reporting and Recovery

Item	Feature	Base Standard		Profile		Support
		Reference	Status	Clause	Status	
E1	Station in "Busy" State Transmits RNR on P/F Cycle	8.1	M		m	Yes
E2	RNR Command/Response Supported (Used to Indicate "Busy" State)	7.2.3 8.1	M		m	Yes
E3	Station Stops Transmission of I Frames Following Receipt of RNR	8.1	M		m	Yes
E4	Does Station Support Use of P/F Bit for Error Recovery	6.3.3 8.2.1	M		m	Yes
E5	REJ Command/Response Supported (Used for Error Recovery)	7.2.2 8.2.2	O		m	Yes
E6	SREJ Command/Response Supported (Used for Error Recovery)	7.2.4 8.2.3	O		o	Yes No
E7	Multi-Selective Reject Command/Response Supported (Used for Error Recovery)	7.2.4 8.2.3	O		o	Yes No
E8	Station Allows More Than One SREJ Command to Be Outstanding	7.2.4 8.2.3	O		o	Yes No
E9	Time Out Recovery Supported	8.2.4	M		m	Yes
E10	Frames with FCS Errors Are Not Accepted and Discarded	8.3	M		m	Yes
E11	Command/Response Frame Rejection Exception Condition Supported	8.4	M		m	Yes
E12	Contention Situations Are Resolved Through Use of Different Value Time Out Functions	8.5	M		m	Yes
E13	Contention Situations Favor Primary Station in NRM or ARM Instead of Secondary Station	8.5	M		m	Yes

A.4.6   System Parameters

Item	Parameter	Base standard		Profile		Support
		Reference	Status	Clause	Min/Max Value	
SPT1a	Range of Parameter, DTEs T1	IS:7776:1986 DAM1	M		Y( ) Max:__ Min:__	Yes
SPT1b	Expected Range of DCEs T1	5.7.1.1	M		Max:__ Min:__	
SPT2	Range of Parameter T2 for DTE operations T1>T2	5.7.1.2	O		Y( ) N( ) Max:___ Min:___	Yes No
SPT3	Range of Parameter T3 such that T3>>T1	5.7.1.3	T3:M		Y( ) N( ) Max:___ Min:___	Yes No
SPT4	Range of Parameter T4 such that T4>>T1 <u>and</u> T4<T3	5.7.14, 5.3.2	T4:M		Y( ) Value:___	Yes
SPN2	Maximum Number (N2) of attempts to complete transmission	5.7.2	M		Y( ) Value:___	
SPN1	Maximum Number of bits in an I-frame (N1) that can be supported if: M8: (N1 $\geq$1080) or M128: (N1 $\geq$ 1088)	5.7.3	M		Y( ) Value:___ N/A	Yes No
SPK1	Maximum Number of Outstanding I-frames (k) if: M8: (1 $\leq$ k $\leq$ 7) M128: (1 $\leq$ k $\leq$ 127)	5.7.4	M		Y( ) Value:___ N/A	Yes

A.5 DTE/DCE Physical Interface (recommended)

This section references EIA 232-D and EIA 530.

A.5.1 General

Item	Feature	Base Standard		Profile		Support
		Reference	Status	Clause	Status	
Interface type:						
I1 I2	- EIA 232-D - EIA 530		O.1 O.1	5.5 5.5	o.1 o.1	Yes No Yes No
Subnetwork access type:						
SN1 SN2	- Leased/Dedicated line - Switched network service	1.6	O.2 O.2		o.2 o.2	Yes No Yes No
Physical Interface:						
PI1 PI2	- V-series - X.21 bis leased circuit service	V.32, V.36 X.21 bis § 5.2	SN1: M SN2: M		SN1:m SN2:m	Yes Yes
SR1 SR2	Data signalling rates: - From 0 to 20 Kbps - From 20 Kbps to 2 Mbps	1.3	I1:M I2:M		I1:m I2:m else x	Yes Yes[1]
Sy NSy	Type of data communication: - Synchronous - Non-synchronous	1.5	O.3 O.3		PI1:m PI2:m	Yes Yes
Electrical Characteristics:						
V28 V10 V11	- V.28 - V.10 - V.11	V.28 V.10 V.11	I1:M else I2:O.4 I2:O.4		I1:m else I2:o I2:m	Yes Yes No Yes
DB25	Connector - DB25	ISO 2110	M		m	Yes

Note 1:   The EIA-422-A standard, "Electrical Characteristics of Balanced Voltage Digital Interface Circuits," which can be used with EIA-530, supports data rates up to 10 Mbps over short cable lengths. The exact distance/frequency tradeoff is contained in the EIA-422 specification. The electrical characteristics are V.11 (X.27), and are consistent with the V.24 Functional requirements as called out in this DSP's Physical Layer specifications.

A.5.2 Interchange Circuits for EIA 232-D [1]

The following are applicable if EIA 232-D is selected.

Item	Feature	Base Standard		Profile		Support
		Reference	Status	Clause	Status	
Interchange Circuits				5.5		
AA	pin 1 - Protective Ground (101)	5.4	O		m	Yes
BA	pin 2 - Transmitted Data (103)		M		m	Yes
BB	pin 3 - Received Data (104)		M		m	Yes
CA	pin 4 - Request to Send (105)		M		m	Yes
CB	pin 5 - Clear to Send (106)		M		m	Yes
CC	pin 6 - Data Set Ready (107)		M		m	Yes
AB	pin 7 - Signal Ground/Common Return (102)	5.5	M		m	Yes
CF	pin 8 - Received Line Signal Detector (109)		M		m	Yes
SCF	pin 12 - Secondary Received Line Signal Detector (122)	5	O		o	Yes No
SCB	pin 13 - Secondary Clear to Send (121)	5	O		o	Yes No
SBA	pin 14 - Secondary Transmitted Data (118)	5	O		o	Yes No
DB	pin 15 - Transmission Signal Element Timing, DCE (114)	5	Sy:M else:O		m	Yes No
SBB	pin 16 - Secondary Received Data (119)	5	O		o	Yes No
DD	pin 17 - Receiver Signal Element Timing, DCE source (115)	5	Sy:M		Sy:m else:o	Yes No
SCA	pin 19 - Secondary Request to Send (120)	5	O		o	Yes No
CD	pin 20 - Data Terminal Ready (108)	5	SN2:M else:O		SN2:m else:o	Yes No
CG	pin 21 - Signal Quality Detector (110)	5	O		o	Yes No
CE	pin 22 - Ring Indicator (125)	5	SN2:M else:O		SN2:m else:o	Yes No
CH/CI[1]	pin 23 - Data Signal Rate Selector (111)	5	O		o	Yes No

Note 2: The CCITT V.24 equivalent assignment numbers are given in parentheses.

Note 3: If SCF is not used, CI is assigned to pin 12.

Item	Feature	Base Standard		Profile		Support
		Reference	Status	Clause	Status	
DA	pin 24 - Transmit Signal Element Timing, DTE source (113)	5	Sy:M		Sy:m else:o	Yes No
RD	pin 9,10 - Reserved for Data Set Testing	3.2.1	O		o	Yes No
RL	pin 21 - Remote Loopback (140)		O		o	Yes No
LL	pin 18 - Local Loopback		O		o	Yes No
TM	pin 25 - Test Mode		O		o	Yes No
UN	pin 11 - Unassigned	3.2.2	O		o	Yes No

A.5.3 Interchange Circuits for EIA 530 [1]

The following are applicable if EIA 530 is selected.

Item	Feature	Base Standard		Profile		Support
		Reference	Status	Clause	Status	
	pin 1 - Shield		M		m	Yes
BA	pin 2 - Transmitted Data A (103) pin 14 - Transmitted Data B		M		m	Yes
BB	pin 3 - Received Data A (104) pin 16 - Received Data B		M		m	Yes
CA	pin 4 - Request to Send A (105) pin 19 - Request to Send B		M		m	Yes
CB	pin 5 - Clear to Send A (106) pin 13 - Clear to Send B		M		m	Yes
CC	pin 6 - Data Set Ready DCE A (107) pin 22 - Data Set Ready DCE B		M		m	Yes
CD	pin 20 - Data set Ready DTE A (108) pin 23 - Data set Ready DTE B		M		m	Yes
AB	pin 7 - Signal Ground/Common Return (102)		M		m	Yes
CF	pin 8 - Received Line Signal Detector A(109) pin 10 - Received Line Signal Detector B		M		m	Yes
DA	pin 24 - Transmit Signal Element Timing A,DTE (113) pin 11 - Transmit Signal Element Timing B,DTE		Sy:M else:O		Sy:m else:o	Yes
DB	pin 15 - Transmit Signal Element Timing A,DCE (114) pin 12 - Transmit Signal Element Timing B,DCE		Sy:M else:O		Sy:m else:o	Yes
DD	pin 17 - Receiver Signal Element Timing A, DCE source (115) pin 9 - Receiver Signal Element Timing B, DCE source		Sy:M else:O		Sy:m else:o	Yes
RL	pin 21 - Remote Loopback (140)		O		o	Yes No
LL	pin 18 - Local Loopback		O		o	Yes No
TM	pin 25 - Test Mode		O		o	Yes No

N ote 4: The CCITT V.24 equivalent assignment numbers are given in parentheses.

ANNEX B

(informative)

CONCLUDING MATERIAL

B.1 Deviations from Base Standards/Referenced Profiles

There are no deviations or selections form the ISO base standards in this part of MIL-STD-2045-14500 outside of those permitted and set forth as base standard options. This DOD Standardized Profile (DSP) addresses the following network service(s):

>   Unbalanced Data Link
>   Physical Layer Recommendations

The DPRL in Annex A depicts the selected options from the base standards under the "Profiles" column.

B.2 Subject Term (Key Word) Listing

>   Allied Communication Publication (ACP)
>   DOD Standardized Profile (DSP)
>   Data Communications Protocol Standards (DCPS)
>   DCPS Technical Management Panel (DTMP)
>   DSPICS Proforma
>   International Standardized Profile (ISP)
>   Unbalanced
>   ConnectionLess Transport Service (CLTS)
>   ConnectionLess Network Service (CLNS)
>   High Level Data Link Control (HDLC)
>   Open Systems Interconnection (OSI)
>   PICS Proforma

B.3 Preparing Activity

>   DISA-JIEO   (Project DCPS-0008)

B.4 Reviewing Activities

>   Army   SC, PT
>   Air Force   13, 17, 29, 33, 90
>   DLA   DH
>   DMA   MP
>   DIA   DI
>   DOT   OST
>   NSA   NS
>   OASD   IQ, DO, IR
>   ODISC4 AC
>   NAVY   EC, CH, ND, TD, OM
>   USMC   MC, CG

B.5   Custodians

DISA: DC
Army: SC
Air Force: 90
Navy: OM
DIA: DI
NSA: NS
USMC: MC
DLA: DH
Other: Joint Staff/Architecture & Integration
                    USSPACECOM

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I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER **MIL-STD-2045-14500-3**	2. DOCUMENT DATE *(YYMMDD)* 940316

3. DOCUMENT TITLE   DOD Standardized Transport Profile, TA21n(D) COTS over CLNS, Part 3: Subnetwork for an Unbalanced Link

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*	b. ORGANIZATION	
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE *(Include Area Code)* (1) Commercial (2) DSN *(If applicable)*	7. DATE SUBMITTED *(YYMMDD)*

8. PREPARING ACTIVITY

DEFENSE INFORMATION SYSTEMS AGENCY (DISA)

a. NAME Rose D. Satz	b. TELEPHONE *(Include Area Code)* (1) Commercial 908-532-7732 (2) DSN 992-7732
c. ADDRESS *(Include Zip Code)* ATTN: TBBF (Rose D. Satz) JIEO Ft Monmouth, NJ 07703-5613	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466

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